



(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:
09.02.2011 Bulletin 2011/06

(51) Int Cl.:
H02K 23/26 (2006.01) H02K 13/04 (2006.01)

(43) Date of publication A2:
28.01.2009 Bulletin 2009/05

(21) Application number: **08013202.0**

(22) Date of filing: **22.07.2008**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT RO SE SI SK TR

Designated Extension States:
AL BA MK RS

(30) Priority: **24.07.2007 JP 2007191738**

(71) Applicant: **Makita Corporation**
Anjo-shi, Aichi-ken (JP)

(72) Inventor: **Sakurai, Naoto**
Anjo-shi
Aichi-ken (JP)

(74) Representative: **Kramer - Barske - Schmidtchen**
European Patent Attorneys
Landsberger Strasse 300
80687 München (DE)

(54) **Electric motors**

(57) An electric motor (M) includes an armature core (10), a commutator (12) including a plurality of commutator segments (12t), a neck (14) disposed between the armature core (10) and the commutator (12), and a plurality of wires (W) each connected between two adjacent commutator segments (12t) and wound around the armature core (10) via the neck (14). The wires (W) include

a first wire connected between first two adjacent commutator segments (12t) and a second wire connected between second two adjacent commutator segments (12t) positioned opposite to the first two adjacent commutator segments (12t) with respect to the axis of the armature core (10). The first wire and the second wire extend along the neck (14) such that they do not contact with each other.

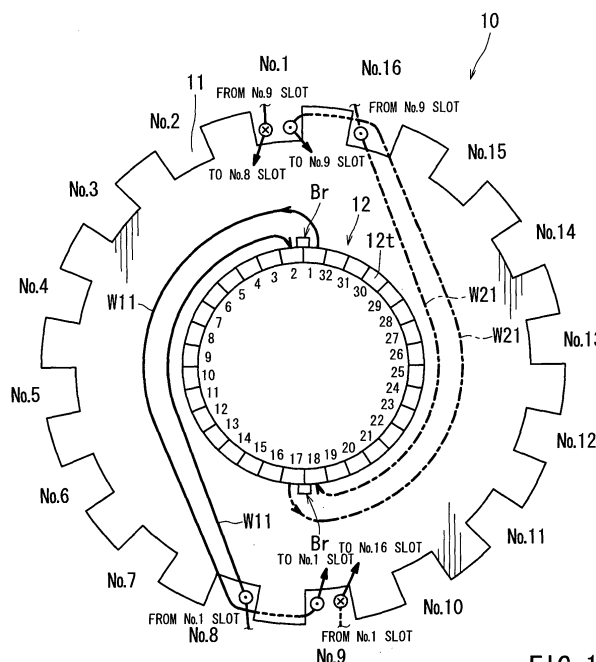


FIG. 1



EUROPEAN SEARCH REPORT

Application Number
EP 08 01 3202

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	EP 0 260 570 A1 (SIEMENS AG [DE]) 23 March 1988 (1988-03-23) * column 3, line 5 - line 53; figures 1-4 *	1-3	INV. H02K23/26 H02K13/04
Y	US 2 503 752 A (CHRISTIAAN MALCHUS JOHANNES AN) 11 April 1950 (1950-04-11) * column 2, line 7 - column 5, line 25; figures 1-4 * -----	1-3	
			TECHNICAL FIELDS SEARCHED (IPC)
			H02K
2 ~~The present search report has been drawn up for all claims~~			
Place of search Munich		Date of completion of the search 28 July 2010	Examiner Türk, Severin
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04C01)



Application Number

EP 08 01 3202

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1-3

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).



**LACK OF UNITY OF INVENTION
SHEET B**

Application Number

EP 08 01 3202

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-3

This invention is directed to an electric motor including a rotor with commutator, wherein details how to design the rotor winding scheme are given. In this first invention, both alternatives of claim 1 are summarised.

2. claims: 4-7

This invention relates to an electric motor including a rotor with commutator, where first and second wires of the rotor winding are defined not to contact with each other when extending along the neck.

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 08 01 3202

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

28-07-2010

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0260570	A1	23-03-1988	DE 3631943 A1 07-04-1988
			JP 63080740 A 11-04-1988
			US 4818910 A 04-04-1989

US 2503752	A	11-04-1950	NONE
